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ABSTRACT

The structure of Switzerland's educational system is described including the types of secondary schools and/or courses and the system of tertiary education. Fields of study, types of institutions, and characteristics of tertiary education in Switzerland are discussed. The chapter on students covers admission procedures, trends in enrollment, success and failure in tertiary education, and research in tertiary education. The relationship between tertiary education and the employment market is examined. Finally, reforms instituted in primary, lower secondary, upper secondary, and vocational and technical education, teaching training, and higher education are outlined. (SPG)

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DIVERSIFICATION OF TERTIARY EDUCATION IN SWITZERLAND

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TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) AND USERS OF THE ERIC SYSTEM."

REPORT

prepared by

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THE DIVERSIFICATION OF TERTIARY EDUCATION IN SWITZERLAND

INTRODUCTION

Education, like many other aspects of public life in Switzerland - a federated state with an area of 41,288 km^2 composed of 25 cantons and half-cantons differing in culture, language and religious faith and a population, in 1976, of approximately 6.4 million (including 1 million non-nationals) - is decentralised. Most cantons share their responsibilities with municipalities. As the cantons and municipalities are autonomous as far as education is concerned, whether compulsory (ordinarily lasting 8-9 years), secondary or university, the main task of the central government is to deal with matters which cannot be handled satisfactorily at the local or regional level. In particular, it adjusts inequalities between cantons in the areas of finance and educational offer. It is more particularly concerned with vocational training, in technical schools and apprenticeships, and this branch is accordingly a homogeneous element in our educational system. The Confederation may also help to protect the interests of cantons which have no university. In addition, it regulates medical studies, with the result that the maturité examinations have now been standarised throughout the country.

Primary school is compulsory and non-fee-paying in state schools. Every canton adopts its own laws and regulations. The diversity of school systems is an impediment to population mobility and efforts are being made to harmonise them for this reason. The six French-speaking cantons have now established a uniform curriculum for the first four years of primary school. Under the terms of a Concordat on the co-ordination of schools concluded by the Conference of Canton Directors of Education, the age for beginning school (6 years) and length of compulsory schooling (9 years) will soon be uniform throughout the country. Municipalities play an important role at this level of education, acting principally through local school boards.

State primary schooling is financed by municipalities and cantons. There are also private schools.

Primary education lasts between 5 and 6 years depending upon the canton. It is ordinarily followed by lower secondary education, which consists of a period of guidance and observation before pupils enter one or another upper secondary course - apprenticeship, full-time vocational training, or the preparatory classes for university entrance (gymnasiums).

Upper secondary schooling is not compulsory. It includes courses in gymnasiums leading to the maturité certificate and giving access to the Federal universities and polytechnics, other courses not ordinarily leading to university admission, and vocational training. Cantons are responsible for secondary education, on the conditions laid down in the regulation on the recognition of maturité certificates by the Federal Council and for vocational education, under the terms

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of the Federal Vocational Training Act and the cantons' provisions for its application. Cantons assume financial responsibility for education at this level but the Confederation subsidises 50% (maximum) of the cost of vocational training.

Although higher education is also subject to the authority of the cantons, eight of which have universities, Article 27 para.1 of the Federal Constitution entitles the Confederation, beginning in 1984, to found a Federal university in addition to the two polytechnics (EPF of Lausanne and Zurich), and to subsidise existing canton universities or schools of higher education. Various schemes have been discussed but the idea of a Federal university has now been abandoned and replaced by the provision of continuing general assistance, beginning in 1969, to cantons having responsibility for a university (Federal Aid to Universities Act/LAU (1)). Interuniversity co-ordination is one of the objectives of the Act, under which higher education in Switzerland becomes increasingly a joint enterprise of the Confederation and cantons having responsibility for a university. At this point, the Confederation is paying about 45% of the cost to the country of tertiary education, including the Federal polytechnics.

The eight canton university-level schools do not have the same position in the canton. That of the two EPFs was defined by a Federal Act of 7 February 1854 instituting a Schools Council, appointed by and responsible to the Federal Council, with responsibility for the general administration, co-ordination and supervision of the schools. The LAU mentioned above instituted the Swiss Conference of Universities (CUS) to further co-operation between Swiss universities and other tertiary schools, and officially established the Swiss Science Council (CSS), founded in 1965 as an advisory body to the Federal Council specialising in questions of science policy. As may be seen in the diagram below (a), the universities and polytechnics are not the only tertiary establishments: there are also the advanced technical schools (ETS), paramedical and social work schools, schools of administration, primary and lower secondary teacher training schools, advanced agricultural training schools etc.

A survey carried out by the Swiss Science Council showed that there were about 180 forms of para-university training. They differ enormously with regard to conditions of entrance, length of courses, type of training etc. The schools giving these courses receive financial aid from public or private sources, or both.

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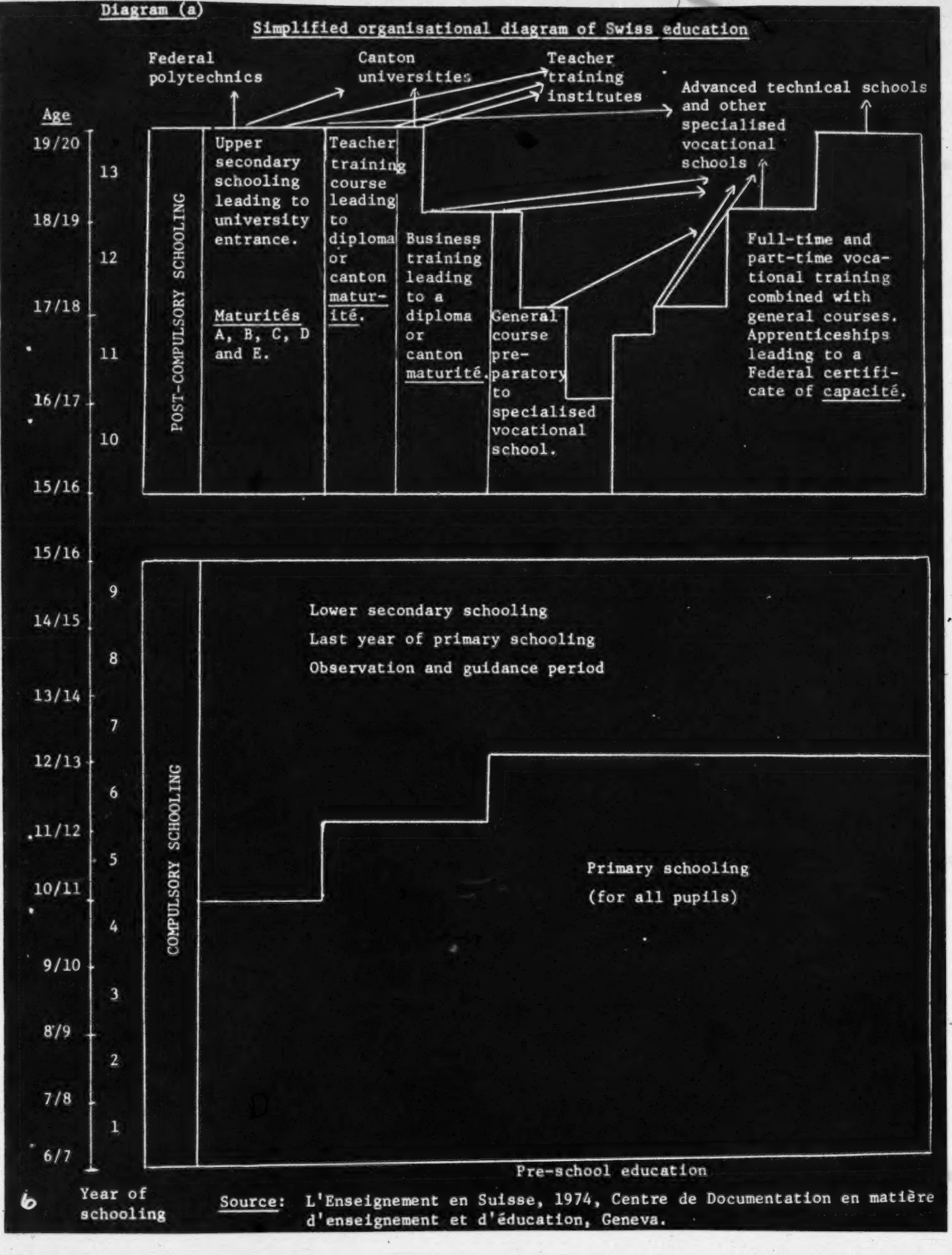
(1) Preceded by transitional regulations.

Diagram (a)

Simplified organisational diagram of Swiss education



Source: L'Enseignement en Suisse, 1974, Centre de Documentation en matière d'enseignement et d'éducation, Geneva.

CHAPTER 1: STRUCTURE OF THE EDUCATIONAL SYSTEM

Part 1: Types of secondary schools and/or courses

Types of schools (upper secondary)

(see diagram on previous page)

a. Gymnasiums leading to the Federal maturité diploma (5 types : A, B, C, D and E).

"A" is a literature course, with Latin and Greek; "B" is a literature course with Latin and modern languages; "C" is a science course; "D" is a literature course with modern languages; "E" is a socio-economic course. Holders of some canton maturités can be admitted to particular departments in particular universities.

b. Teacher training schools, training primary schoolteachers in some cantons and leading to a brevet.

c. Business schools, leading to a canton diploma or maturité (holders of the latter may be accepted by certain university departments).

d. "General education schools", whose aim is to prepare young people having completed their compulsory schooling to enter specialised vocational schools (paramedical, social, pedagogical, preschool etc). This is a 2- or 3-year course leading to a "non-professional" diploma.

e. Vocational education: theoretical and practical instruction in preparation for a specific vocation or trade; includes general courses.

Where the accent is on practical training, this usually takes the form of apprenticeship. Where the emphasis is on theoretical training, the instruction is given in schools.

Apprenticeship is the most widespread form of vocational education in Switzerland, and is subject to the largest number of Federal regulations: denomination of the occupation, length of apprenticeship, organisation of examinations. Thus far, the Confederation has adopted regulations for apprenticeships to 280 trades. Article 7 of the Federal Vocational Training Act stipulates that "the aims of apprenticeship are to give the apprentice the skill and knowledge needed for employment in his trade, and to complete his education".

Practical training is usually acquired by working with a master (in a public or private firm), who signs an apprenticeship contract with the parents of the apprentice (who must have completed his 15th year). The corresponding theoretical instruction and general courses are given in vocational schools, which the apprentice attends at least one full day (or two half-days a week.

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For some apprentices, however - those in the advanced vocational schools (Berufsmittelschülen) in particular - two additional half-days are spent in general education classes. Apprenticeships usually last 2 to 4 years, depending upon the trade, and end with the award of a Federal certificate of capacité.

Some large firms have their own vocational schools for apprentices, who receive all three parts of their training (practical, theoretical and general) inside the firm, in accordance with the relevant Federal and canton regulations.

f. Full-time vocational training in specialised schools

Schools may be run by the canton or municipality or privately, but all are subsidised by the Confederation. Trade guilds and associations also contribute in varying degrees to the expenditure approved by cantons and municipalities. There is such diversity in these schools that it is difficult to classify them for purposes of presentation; only those which immediately follow compulsory schooling are mentioned below. They include:

- arts and trades schools and schools of decorative arts, which award Federal certificates of capacité (of the same type as those issued at the end of an apprenticeship) but provide a more thorough theoretical and practical background than can be obtained by apprentices in their part-time courses at vocational schools. Pupils subsequently wishing to enter a more advanced specialised school (advanced technical schools, institutes of visual arts) are accordingly better placed to pass the entrance examinations. Apprentices now attending "advanced vocational schools", however, have the same advantages as those in this form of full-time schooling;

- advanced business schools and schools of administration, often combined under a single administration; also, the course leading to the socio-economic maturité. A diploma is given at the end of 3 years of study (whereas the maturité ordinarily requires a further year). The diploma also entitles holders to receive the corresponding Federal certificate of capacité. The theoretical and general background acquired facilitates further study in some areas, especially with a view to the Federal maîtrise examinations. The administration courses provide basic material for young people who want to train for certain sectors of the Federal administration (railway, post office, customs), which they cannot do before they are 17.

Training for agricultural occupations is also regulated by the Federal Department of Public Economy. It is usually given in agricultural schools, most of which do not run year-round courses and are open only during the winter. Pupils holding diplomas from these schools may go on to the Swiss Agricultural Technicum, a horticultural technicum or an advanced viticulture or forestry school for further training.

Other types of intermediate schools linking upper secondary and tertiary education are described under 1.2.

The lower age-limits for admission to these schools and the length of their courses of study are recorded in organisational diagram I.

PS: Schools in (a)-(c) may lead to university.

Schools in (d)-(f) usually do not lead to university.

The enrolment figures for the different types of schools show the following trend:

1970		1975
27,267	Gymnasiums	35,175
4,961	Business schools	4,801
12,489	Teacher training schools	16,081
44,717	Upper secondary	55,057

Source: 3rd CSS report, 1977.

The gymnasium population rose by 41% between 1969 and 1975. Enrolment in teacher training schools followed the same pattern until 1974, but diminished by nearly 4% the following year, whereas enrolment, at gymnasiums continued to rise. However, a slight check in the trend does not yet indicate a real shift from teacher training schools to the gymnasiums. Enrolment in business schools has been falling since 1973 and was lower in 1975 than it was in 1970, and this indicates a further levelling-off of the growth of the upper secondary school population between 1974 and 1975. Also as has been pointed out before, there has been no marked increase in the numbers moving on from compulsory to upper secondary schooling.

The number of canton and Federal maturités (combined) awarded at the end of the upper secondary course, not including those issued by the Federal maturité board, rose by 31% between 1970 and 1975; but the figure is higher (35%) for non-university cantons than for the university cantons (ZH, BE, FR, BS, SG, VD, NE, GE), where it is only 29%. The ratios are as follows:

	1970	%	1975	%
university cantons	3,573	63.5	4,617	62.5
non-university cantons	2,055	36.5	2,774	37.5
Total	5,628	100.0	7,391	100.0

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This shows that non-university cantons are beginning to take a larger share in the "production" of maturités.

Source: 3rd CSS report, 1977.

At the end of their compulsory schooling, most young people enter some form of apprenticeship. The figure has been around 63% for each of the last five years. In relative terms, there has been no marked change in the proportion beginning apprenticeship. In absolute figures, the number of contracts rose from 44,773 in 1969 to 52,779 in 1975, an increase of approximately 18%.

INDEXED RISE IN NUMBERS OF NEW AND CURRENT APPRENTICE CONTRACTS 1969-75 (1970 = 100)

1970		1975
45,592	NEW CONTRACTS	52,773
128,682	CURRENT CONTRACTS	145,904

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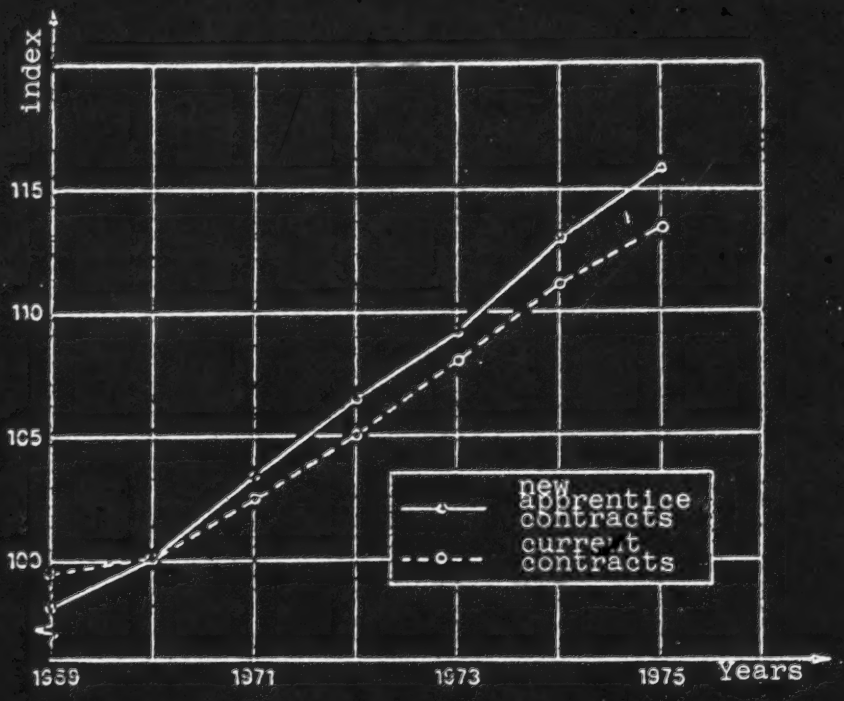

Sources: Annuaire statistique de la Suisse, BFS, Bern

3rd CSS report, 1977.

The figure for new contracts refers to apprenticeships applied for. The numbers of new and current contracts are growing side b/ side. These are the years of expansion.

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Current contracts increased by 14% between 1969 and 1975.

According to the CSS report, however, almost a quarter (23%) of the 8th year school population does not appear in these figures - either in those for the 10th year (entrance to upper secondary schooling) or as new apprenticeships. Other forms of training exist, as mentioned above, but it has not been possible to obtain exact enrolment figures. These are the different vocational schools (eg agriculture). However, there is also a large sector of traditional training (agriculture again, for example, or the paramedical occupations) for which figures are lacking, and then there is the proportion of the population which does not "choose" to continue studying; and there is the fact, determined by upon economic, social or geographical considerations, that fewer girls than boys elect to follow one or another of the courses mentioned above. These facts must not be forgotten.

The exact numbers moving on from upper secondary to tertiary education cannot be calculated from statistics now available. Nevertheless, in 1975-76 13.5% of the 20-21 age-group entered non-university tertiary education, and 5.4% entered university. It should also be observed that some students begin working or spend time abroad before continuing their studies - this is especially true of the holders of teacher training diplomas, who must teach one or two years in primary schools.

A few figures 1975-76:

	Total enrolment	girls
- Upper secondary education leading to the maturité	35,679	13,823
- General education course, upper secondary level	3,781	3,337
- Teacher training schools - primary teacher training + some training schools for lower secondary teachers	15,173	9,599
- Pre-school	2,066	2,063
- Business schools (diploma)	7,759	5,095
- Advanced technical schools (ETS) (concerned with tertiary sector but giving access to EPFs and some university departments)	6,886	(1)
- Agriculture schools	6,460	(1)

Sources: Annuaire statistique de la Suisse 1976 and school statistics

	Total population	girls
- Apprenticeship contracts running end 1975	145,904	41,972

(1) Statistics not available.

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7,868 maturité certificates were awarded in 1975, and 47,201 candidates (including 15,446 girls) successfully passed end-of-apprenticeship examinations.

In the 1974-75 winter term, first-year students were divided as follows, in terms of their university entrance qualification:

Type of certificate	total		
	Swiss	Aliens	total
recognised by the Confederation canton maturités	5,634	346	5,980
Federal maturité board	563	65	628
canton business maturité	551	37	588
other	160	26	186
technicum	53	10	63
primary and secondary teach.	622	12	634
full entrance examinations	111	81	192
other (eg partial exams)	133	112	245
foreign certificates	335	2,158	2,493
unspecified	299	246	545
total	8,461	3,093	11,554

Source: Federal Statistics Bureau (BFS), with corrections by the University of Zurich

Part 2: The system of tertiary education

2.1 Fields of study

The departments of Swiss universities are (more or less) traditional on the whole:

- Theology (Protestant, Roman Catholic, Christian Catholic)
- Law
- Economic and social sciences
- Literature (philosophy, history, philology)
- Natural sciences
- Medicine (human, dental, veterinary)

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There are also departments for:

- the training of lower and upper secondary school teachers, and primary teachers in some cantons
- training of PE and sports instructors.

The Federal polytechnics (EPF) have either sections (EPF Zurich):

- Architecture
- Civil engineering
- A: Mechanics
- B: Electrotechnical
- Chemistry
- Pharmacy
- Forestry
- Agriculture
- Rural engineering and topography
- Mathematical and physical sciences
- Natural sciences
- Military sciences
- A: General section, free courses: sub-section - philosophy and economic sciences sub-section
- B: General section, free courses: sub-section - mathematics, natural and technical sciences

or departments (EPF Lausanne):

- Civil engineering
- Rural engineering and surveying
- Mechanics
- Electricity
- Physics
- Chemistry
- Mathematics
- Materials
- Architecture

(For canton universities and EPFs, see Appendix I: draft catalogue of fields of study, now under discussion, to be incorporated into the new Swiss university statistics.)

Advanced technical schools (ETS) give instruction in the following:

- Architecture
- Civil engineering
- Mechanics
- Electronics
- Heat
- Climatisation
- Chemistry
- Chemical engineering
- Technology
- Automobile technology
- Micro-technology
- Nuclear engineering
- Measurement
- Graphic arts

However, each invididual ETS offers only part of the above, depending upon its geographical location and industrial environment.

Specialised agricultural schools give instruction in farming, vine-growing, horticulture, aviculture and dairy farming and products.

In addition to the above types of establishments, there are a large number of other schools teaching the following:

- para-medical training
- tourism, commerce, administration, transport
- media, information, communications
- social work
- artistic activities etc.

Statistics for this category are very fragmentary.

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Approach and emphasis

It should be observed that Swiss universities - to begin with them - are concerned not only with teaching and research and professional training; they also fulfil an important function as the cultural centre of their region. The two Federal polytechnics train engineers and architects as well as scientists - professions for which a high standard of qualification must be ensured throughout the country.

With regard to degrees, 4 to 5 years are required in all tertiary schools for the first or bachelor's degree (universities) or diploma (EPF), followed by 2 to 4 further years for a doctorate. In some departments of certain universities, however, no diploma or first degree is required before the doctorate. Medical studies are organised on a different basis (with in-service training in hospitals), and require 13 semesters of study before the final examination. A first degree is generally associated with the writing of a monograph, a doctorate with that of a dissertation (in German-speaking Switzerland) or thesis (in French-speaking areas (1)).

The advanced technical schools (ETS) are often regarded as essential to the industrial future of the country, for they produce the intermediary level of technicians required by firms. Their approach, therefore, is primarily vocational; they issue engineer-technician diplomas at the end of three years of study.

The other types of schools mentioned above are concerned chiefly with vocational training and/or general education.

In addition to holders of the maturité, pupils possessing the engineer-technician diploma may also apply for admission to the EPFs.

Transfer from one department or course to another within a university is not difficult, with one exception - transfer from any other subject to medicine. Transfer from one university to another is not so easy because curricula are not identical and this complicates the establishment of equivalences. Candidates holding a "good" first degree can obviously prepare their doctorates in another university.

In French-speaking Switzerland efforts are being made to improve co-ordination between universities by holding joint seminars and setting up identical "third level" courses in several subjects.

Full-time/part-time study, length of courses

The course given at universities and EPFs are full-time, which creates problems for students with part-time jobs, for they must remain longer. As said before, the length of 1st and 2nd level courses (first degree or diploma) and the number of years of study required for doctorates varies from university to university and department to department. Some courses are programmed. As a rule, studies are longer when they do not correspond exactly to a programmed course.

(1) Supplemented by a wide range of state examinations for theologians, secondary and gymnasium teachers, lawyers and notary publics etc.

Some advanced technical schools (ETS), however, offer evening classes also leading to the engineer-technician diploma; course length varies between 3 (full-time schools) and 4 years (night school).

Some courses in the social field are also taught at night (4-year course), whereas the full-time students complete the course in 3 years.

Advanced agricultural schools offer a 3-year course, with 1-year specialisations.

In some cantons lower secondary school teachers may train in 3 or 4 years of full-time study at special schools.

Paramedical staff are trained in 2-3 years, full-time.

2.2 Types of establishments

For its 6 million inhabitants, Switzerland has 7 canton universities (Basel, Bern, Fribourg, Geneva, Lausanne, Neuchatel and Zurich), the Institute of Economic and Social Sciences at St. Gallen and the 2 Federal polytechnics at Zurich and Lausanne.

Although most have been founded longer, the Swiss universities may rightly be called creations of the 19th century, for it was then that they underwent decisive transformations and alterations with regard to both organisation and theory. The Zurich EPF, also founded in the 19th century, brought the technical sciences to a position of respectability in Swiss higher education.

The canton universities and EPFs teach and encourage research in the fields listed on the previous pages. The universities of Fribourg and Neuchatel have no medical departments, but students in the science department at Fribourg can do the first 4 semesters of medicine and sit the first 2 preliminary exams there, while those at Neuchatel can take 2 semesters of medical courses and sit the first exam.

Freedom and unity of education and research are guaranteed in all university-level establishments, universities or state institutes. A distinction should be made between the 2 EPFs which are run entirely by the Confederation, and other schools at this level which are all administered by cantons with the exception of the Institute of Economic and Social Sciences of the town and canton of St. Gallen. However, the 8 canton schools do not all have the same status in their cantons, and thus are not all equally autonomous.

The ETS are canton, municipal or inter-canton schools approved by the Confederation. There are 15 full-time establishments and 8 night schools. A standing Federal committee ensures that the Confederation's minimum standards are met.

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There are 21 schools of social work (for social workers, remedial teachers, guidance counsellors etc), mostly run by private or semi-private associations.

Paramedical instruction is given in 105 establishments (eg nursing schools), more or less closely attached to hospitals. The Red Cross is the authority responsible for courses (in nursing, medical-therapeutic and medical-technical professions), in pursuance of a convention concluded between that body and the cantons (20 May 1976).

Apart from the advanced schools of administration (Höhere Wirtschafts- und Verwaltungsschulen) which are financed by public funds, all schools of business, tourism, transport and administration (34 in all) are private.

Most of the (4) schools for interpreters and translators are semi-private.

2.3 Characteristics

a. University-level schools

The financial and administrative authority for each university is the department of education of its canton. Academically, however, it enjoys a large measure of autonomy under the Universities Act. Some schools at this level also have considerable freedom of management (in the French-speaking cantons especially) whereas others (eg Bern) are almost wholly run by the canton administration. The EPFs, attached directly to the Confederation, are largely autonomous in all respects.

During the 1960s people came to see that in Switzerland it would be unreasonable for each university to continue pursuing its separate course; and that the university cantons could not be expected to go on bearing the full financial burden of the higher education offered in their schools. With the preparation and adoption of the Federal Aid to Universities Act (LAU) of 28 June 1968, a movement to encourage co-ordination between universities was accordingly put in hand, and the Confederation undertook to give financial support to the canton universities. Two national advisory bodies for university policy were set up, the Swiss Science Council and Swiss Conference of Universities. They provide the institutional framework for effective and co-operative university federalism. The Conference of Universities strives to establish a balance between the principle of canton autonomy and the need for greater co-ordination of university-level schools at the national level. Its underlying conviction is that the problems of the Swiss universities can be solved almost entirely by a permanent dialogue and freely concluded agreements. The body is essentially an assembly of cantons responsible for universities or other school of that level (the Federal polytechnics as well), but it also includes representatives of non-university cantons, students' associations and

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the Confederation. The responsibilities of the Swiss Science Council, as the Federal Council's advisory body on all questions of national and international science policy, are even greater. University problems form only a fraction, albeit an important one, of its many activities. In this area the Council is responsible under the Act for making recommendations relating to the development and co-ordination of schools, and guiding universities undertaking structural and curriculum reforms; it also co-operates with universities by expressing its views on the proposals and reports of the Conference of Universities.

The two bodies have equal status. Their different memberships and terms of reference help to achieve a national division of labour. The Science Council deals mainly with general considerations and guidelines, whereas the Conference of Universities is engaged in more practical activities. The former must try to present a total view of Swiss university problems as a basis for guidelines and recommendations designed to assist the universities and contribute to their expansion and better organisation. The Conference of Universities, on the other hand, is the body which unites cantons and universities to discuss the numerous tasks they share and agree upon solutions.

Although a federative state, Switzerland has no Federal Ministry of Education. On 23 December 1968, however, the Federal Council decided to set up an Office of Science and Research in the Federal Department of the Interior. In addition to supervising the application of the LAU and dealing with questions relating to the Federal polytechnics, it is also responsible, in so far as the Confederation is concerned, for the following:

- discussion of questions of principle concerning science and university policy;

- problems of basic and applied research not undertaken for immediately economic purposes, and problems concerned with research into and uses of atomic energy;

- questions affecting scientific personnel and scholarships, maturité certificates and educational research and planning.

In the past, university policy was primarily concerned with quantity, but the close connection between the quantitative and qualitative aspects of university growth has now been understood, and in 1971 this led to the setting up by the Conference of Universities and Conference of Rectors, of a Committee for Curriculum Reform as a response to an immediate need. The present membership of this body is as follows: 4 professors, 2 students and 2 directors of education. The committee operates on three levels: firstly, it seeks to express certain basic concepts; secondly, it sets up departmental working parties by subject, to consider the objectives of reforms of instruction and methods in modern languages (with special emphasis on teacher training), law,

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psychology, biology, architecture and sociology. Some of their reports have already been completed. This body also commissions and finances outside research projects, co-ordinates the activities of the working parties and gives them instructions and indications relating to the goals in each field. By acting as co-ordinator and initiator of research on general subjects (eg control of aptitudes and performance) it is helping to create a sounder basis for comparisons between the reforms carried out by different universities and for the planning of new institutions of higher education.

In several fields of study there is co-operation on the regional as well as the national level. The conventions of the French-speaking Universities Conference are concerned with co-operation between French-speaking university cantons and their tertiary schools. Several of these instruments have been signed, including an Outline Convention of 3 December 1969, under which the French-language universities agreed to work together at the level of post-graduate studies.

It is universally agreed that heterogeneity of educational methods and regulations is no longer appropriate in an era of accelerated and intensified mobility of persons, ideas and knowledge. The needs of modern research, requiring ever more equipment and ever larger and more highly-qualified teams, make national options imperative.

b. ETS

The ETS study programmes meet international standards. Instruction is in conformity with the model for the organisation of education recommended by the Council of Europe. The qualification of ETS engineer is recognised by the European Federation of National Associations of Engineers.

In some cantons these schools come under the canton departments of economy, in others under the departments of education. They are subsidised by the Confederation (Federal Department of Economy), and are closely associated with the economic development of their regions; this accounts for the special features of each, although the Confederation may, in agreement with the cantons, lay down uniform minimum standards for, curricula and exams. There is a link between the ETS and EPFs in the sense that graduates of the former may enter the latter as 5th semester students, in the division or department of their previous field of study, or a related one. The same is true of the schools of agriculture. Most universities accept ETS graduates, at least in some departments, after an entrance examination and a period of further study.

At the national (and in some cases cantonal as well) level, an attempt is being made to reduce disparities and improve co-ordination. It is sometimes difficult to unite interests which have diverged throughout history: ETS, employment, vocational training,

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university, higher education as a whole, basic research and so forth. Nonetheless, people are trying to think "globally", gradually abandoning the sectoral approach to education at every level and in all courses. This is the underlying idea of the Science Council's 3rd report, now being prepared, on university development. For the first time, a body has made an effort to consider every dimension of education in Switzerland.

c. Other institutions

The schools for social work all come under the Schweizerische Arbeitsgemeinschaft der Schulen für Sozialarbeit, a private organisation which co-ordinates curricula, entrance requirements and diplomas. In French-speaking Switzerland, similar courses may also be taken at the university.

Paramedical training (nursing in particular) is given primarily in canton schools but also in some private schools (and hospitals); all teach uniform curricula drawn up by the Swiss Red Cross.

The schools which (in some cantons) train lower secondary school teachers are administered by the cantons. Their graduates may enter some university departments.

As mentioned before, there are over 180 para-university courses in Switzerland, some controlled by public authorities and others run privately or jointly. This report mentions only a few features of the most important of them, for an exhaustive or consolidated analysis would be impossible.

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CHAPTER 2: STUDENTS

2.1 Admission

2.1.1 Conditions

a. Canton and Federal schools, university-level

Anyone holding a maturité certificate recognised by the Confederation (1) in category A, B, C, D or E, may matriculate in one of the polytechnics or begin medical studies without further preliminary examinations. According to the rule, he may also matriculate in all departments at all universities.

A foreign student holding the diploma required for university entrance in his own country can usually obtain an equivalence enabling him to matriculate in one of the 10 university schools, but may not sit Federal medical exams. The recognition of foreign secondary school certificates is decided on an individual basis by each university. Applicants whose certificates are not accepted as equivalent to the Swiss maturité may sit entrance examinations which are held twice each year in Fribourg under the auspices of the Swiss universities. Adequate knowledge of the official language of instruction is a sine qua non condition of acceptance. Most universities require applicants with some other first language to sit a language examination. The EPFs will only accept foreign applicants who hold recognised certificates and have obtained very high marks without further examination. Most foreign applicants are required to sit an entrance examination, and this rule is compulsory at St. Gallen (where foreign students may not exceed 25% of the total).

A student holding a canton maturité certificate can matriculate in a few departments of some universities without any further examinations. Those holding a primary education brevet may enter a few departments but only after sitting a supplementary examination. Anyone else wishing to matriculate in any of these 10 schools must sit an entrance examination held by each department on whatever conditions it decides.

In Geneva some university departments have begun admitting candidates without any secondary diplomas. Admission is based on interview and further selection takes place during the first semester.

The danger of bottlenecks first appeared in the field of medicine, initially in pre-clinical and then during clinical training. As early as 1966 the Swiss Conference of Universities set up a committee to investigate the problem of medical studies and instructed it to organise a pre-matriculation campaign, whose aim was to avoid the adoption of enrolment restrictions at national level, or at least to postpone their implementation as long as possible. To this end, universities needed to know the number of entering students beforehand, so they could take steps to increase the number of

(1) Those unable to follow a traditional gymnasium course, leading to one or another of these certificates may prepare in a private school or at evening classes (which exist in the larger towns) and sit Federal maturité examinations, which have been held by the Federal Maturité Board since 1888; successful candidates receive a Federal maturité and may apply for university admission.

available places and adopt other emergency measures. When the demand for one university cannot be met, students unable to matriculate there are transferred to another school which still has some free places or is able to make emergency arrangements to take them. This system of pre-matriculation can only work, of course, so long as the overall demand for places does not exceed the total number of places available in all Swiss universities, which is still the case in 1977-78.

The situation has now deteriorated in other fields, witness the fact that several universities have been compelled to institute compulsory pre-matriculation for some or all fields of study, or have at least requested permission to do so. This has led the Conference of Universities to adopt other measures. In 1974 it approved an "agreement ensuring equality of treatment among cantons with regard to university entrance", for the cantons responsible for universities. Under this "non-discrimination" agreement as it is called, cantons responsible for universities undertake not to give priority to their own students in respect of university entrance. In other words, if a numerus clausus were to become unavoidable in certain cantons, all Swiss nationals and foreigners residing in Switzerland would be treated alike, whatever their place of residence. Should such an agreement come into force, the effectiveness of co-operative federalism and horizontal university co-ordination would then become apparent. If, in spite of all efforts to avoid a numerus clausus, it were to be introduced at the national level in one or another field of study, new regulations governing university admission would have to be enacted to supplement the non-discrimination agreement. The Conference of Universities is in the process of investigating possible solutions to this problem.

Most university courses are also open to auditors, ie persons not taking courses for credit towards a degree.

b. Advanced technical schools (ETS)

Candidates wishing to enroll as full-time students in most ETS must hold a Federal vocational certificate of capacité (CFC - end-of-apprenticeship diploma) in their chosen field and must pass a competitive entrance examination in mathematics, first language and technical drawing. Preparatory courses for this examination are offered by many vocational and trade schools. Final admission is usually decided on the basis of the results obtained during the first semester of study. Applicants having attended vocational high school must also sit an entrance examination, but it is much less important. Holders of canton or Federal maturité certificates are accepted without examination provided they have had at least one year of guided practical training in a firm or technical office specialising in their chosen field of study. In the canton of Vaud, applicants holding the canton technical baccalauréat are automatically eligible to attend the ETS. In addition to pupils with prior work experience, the Geneva ETS accepts applicants who have just completed their secondary schooling, ie immediately after their 9th year of education.

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The CFC or training of equivalent value in a field related to that of the applicant's choice are required for admission to ETS evening schools. Applicants must be able to prove their employment. There is no entrance examination before the 1st semester, and selection takes place during training (the 1st semester being probationary).

c. Other schools

Holders of the primary education brevet or the maturité may enrol in lower secondary teacher training schools. To undertake training in social work, applicants must have completed a course at a gymnasium (maturité) or upper secondary school, or an apprenticeship supplemented by work experience. As a rule, the same conditions apply in respect of other fields of study, although with variations in the different cantons and schools.

2.1.2 Guidance

Academic and other guidance and counselling at university level (guidance and counselling of upper secondary pupils and of students) are centralised in virtually all cantons (or university cantons). In some cases, they are organised on an intercanton basis. The department of education is the responsible body at canton level in nearly every case, while general vocational counselling often comes under the department of economy or the interior.

Between 1972 and 1974 a committee of the Swiss Conference of Universities studied various problems related to vocational guidance at university level and submitted its recommendations in a report published in 1974.

It is generally agreed in Switzerland that guidance should be associated with a process of selection, nor should it be actively connected with any positive policy. Guidance should be a means of helping the student to find himself and take personal decisions. It must not be reduced to an imposition of choice to suit the needs of the economy. On the other hand, information must be provided regarding occupations and employment possibilities. For this reason, the committee argued, research into occupations, as the essential foundation for guidance and information must be intensified in Switzerland. The present stage of development of these services has not entirely kept pace with the situation of tertiary education, which is becoming increasingly diversified. Co-ordination of all such services at the national level is highly desirable.

2.1.3 Special measures for disadvantaged students or applicants

The following are among the difficulties which students (or would-be students) may find themselves facing:

- financial: met by grants awarded by the cantons, subsidised by the Confederation. There are still too many disparities between cantons; harmonisation of the size of grants and conditions of their award is desirable. Grant-holding students must keep the grants committees informed of ./.

the progress of their studies, and thus cannot remain indefinitely at the university without valid reasons. Grants are also awarded, by both cantons and Confederation, to nationals of developing countries or as part of a foreign exchange scheme.

- social difficulties: Children living in uninformed circles are obviously at a disadvantage, and this must be overcome by school and guidance services, which are at present inadequate.

Crèches are being set up in the universities for married students with children, and part-time courses should be instituted for "Werkstudenten".

2.2 Trends in enrolment

Between the 1960-61 and 1976-77 winter terms, attendance at Swiss universities rose from 21,181 to 54,198 (see tables on following pages).

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Enrolment by field of study, school and sex (excluding EPF) 1976/77 Winter term

Field of study	Sex	Basel	Bern	Fribourg	Geneva	Lausanne	Lucerne	Neuchatel	St. Gallen	Zurich	Total	Winter term 1960/61 Overall figures
Theology	T	142	135	306	70	84	162	39	--	151	1'089	855
	F	28	29	18	25	19	30	10	--	45	204	52
Law	T	770	1'249	597	744	715	--	225	--	2'131	6'431	4'058
	F	198	215	101	273	218	--	64	--	411	1'480	432
Economic and social sciences	T	444	561	621	1'010	813	--	236	1'696	1'215	6'596	743
	F	63	45	86	329	215	--	52	140	153	1'083	17
Medicine	T	1'607	1'038	269	1'257	1'137	--	61	--	2'651	8'620	3'355
	F	371	347	61	389	280	--	32	--	643	2'123	495
Literature	T	1'363	1'686	1'518	1'441	787	--	567	--	4'686	12'153	4'239
	F	565	704	701	921	486	--	282	--	2'146	5'806	1'869
Sciences	T	1'133	1'508	558	1'310	836	--	479	--	1'957	7'781	4'125
	F	240	294	125	419	302	--	95	--	444	1'920	549
Other fields	T	7	86	--	2'017	259	--	146	--	--	2'515	--
	F	3	34	--	1'278	200	--	107	--	--	1'622	--
Total	T	5'471	6'863	3'959	7'849	4'631	162	1'753	1'696	13'791	45'185	17'375
	F	1'469	1'668	1'092	3'634	1'720	30	643	140	3'842	14'233	3'414

T = Total
F = Women students

Sources: - Student statistics, 1976/77 winter term, Federal Statistics Office (BFS)
- Annuaire statistique de la Suisse, 1961.

Enrolment by section/department and sex, Federal polytechnics

1976/77 winter term — 1960/61 winter term

Department	Sex	EPF Lausanne	ETH Zurich	Total	Overall figures
ETH/EPF	T	1857	7156	9013	3,941
	W/F	169	716	885	173
Architecture	T	287	784	1071	
	W/F	65	116	181	
Civil engineering	T	266	515	781	
	W/F	8	5	13	
Mechanics	T	238	836	1074	
	W/F	1	6	7	
Electrotechnology	T	337	987	1324	
	W/F	9	7	16	
Chemistry	T	130	640	770	
	W/F	22	29	51	
Pharmacy	T	.	369	369	
	W/F	.	208	208	
Forestry	T	.	267	267	
	W/F	.	12	12	
Agriculture	T	.	620	620	
	W/F	.	76	76	
Rural engineering + topography	T	99	272	371	
	W/F	3	11	14	
Math. + Physics	T	465	900	1365	
	W/F	59	65	124	
Mathematics	T	88	.	88	
	W/F	16	.	16	
Physics	T	179	.	179	
	W/F	17	.	17	
Spec. Maths	T	198	.	198	
	W/F	26	.	26	
Natural sciences	T	.	793	793	
	W/F	.	124	124	
Materials	T	35	.	35	
	W/F	2	.	2	
PE + sport	T	.	173	173	
	W/F	.	57	57	

T = Total
W/F = Women

Sources: - Student statistics, 1976/77 winter term, Federal Statistics Office (BFS)

- Annuaire Statistique de la Suisse, 1961

ETS enrolment has risen from 5,452 to 6,886 in 1975. For all ETS, total enrolment fell by 7.8% between 1972 and 1976; the main cause for this was the institution of ETS night schools (-25%). The enrolment at full-time ETS, on the other hand, rose by 0.6%. Between 1954 and 1972, however, enrolment rose by over 300%.

For all ETS, a substantially greater number of places are offered than applied for (in respect of 1976, approximately 30% for full-time ETS and 56% for night school). The gap between places available and places filled varies from one ETS to another and one section to another. The electrotechnology and electronics sections tend to have the highest enrolments (1976) (Source: 3rd CSS report, 1977).

On the basis of statistics now available it is impossible to give fuller particulars of other branches of tertiary education. A Swiss Science Council survey has estimated that approximately 30,100 persons including 14,000 entering students and 2,200 holders of maturité certificates) were enrolled in one or another para-university course in 1975/76:

Teacher training schools	7,425
Social work schools	1,800
Paramedical courses	7,600
Commerce, transport, administration, tourism	3,100
Media, information, communications	620
Technical (ETS) and agricultural schools	9,500

Source: 3rd CSS report, 1977

In its 3rd report the Science Council has made forecasts of Swiss student enrolment trends.

According to the experts, the presumed consequences of the economic situation at university level (eg reduced enrolment in engineering, economic and social sciences) are discernible but not likely to make any radical difference in the overall number of students in future. In this connection attention should be paid to the impact of the employment market and its premonitory aspect: in the medium term this may affect the numbers of students electing to study particular subjects but it is unlikely to discourage them from embarking upon a course of tertiary education, if only by virtue of the fact that alternatives at lower levels are also invariably ruled out. On the contrary, the precariousness of the employment market may determine even more young people to opt for advanced study - assuming, of course, that there are still enough places open to them.

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In view of the basic principle of freedom of access to tertiary education, the recent efforts to increase that freedom still more, the population bulge (increased enrolment at gymnasium level) and the tendency of more young people to opt for a higher education (seen in forecasts for entering student populations), the rate of university-level matriculation of the resident population in the 20-29 age-group should continue to rise until 1984-86, although less sharply than in the period from 1969/70 to 1975/76 (see below), and remain stable thereafter. Attendance of the 20-24 age-group should rise from 8.9% in 1975 to approximately 11% in 1985.

Trends in school enrolment of the resident population of Switzerland: students in tertiary education

by year, between the ages of 19 and 27, from 1969/70 to 1975/76

Enrolment figures below include both Swiss nationals and foreign students living in Switzerland before beginning higher education.

Age	1969/70	1971/72	1973/74	1975/76
19 years	1.5%	1.7%	2.2%	2.7%
20	2.9	3.4	4.4	4.9
21	3.5	4.4	5.1	5.7
22	4.2	4.7	5.1	5.7
23	3.8	4.5	4.8	5.3
24	3.7	4.0	4.3	4.8
25	3.1	3.4	3.5	3.8
26	2.4	2.7	2.6	2.9
27	1.6	1.9	1.9	2.2

Sources: Resident population of Switzerland by age, BFS, Bern
Student statistics, SIUS-BFS, Bern

In 1976 the number of 19-year-old students in proportion to the total resident population of that age is almost the same as the number of 26-year-old students in proportion to the total population aged 26, whereas in 1969/70 the proportion at 26 was 60% higher than at 19. During the interim the rise in enrolment of 19-year-olds was on the order of 80% (the same figure as for first-year students under 20).

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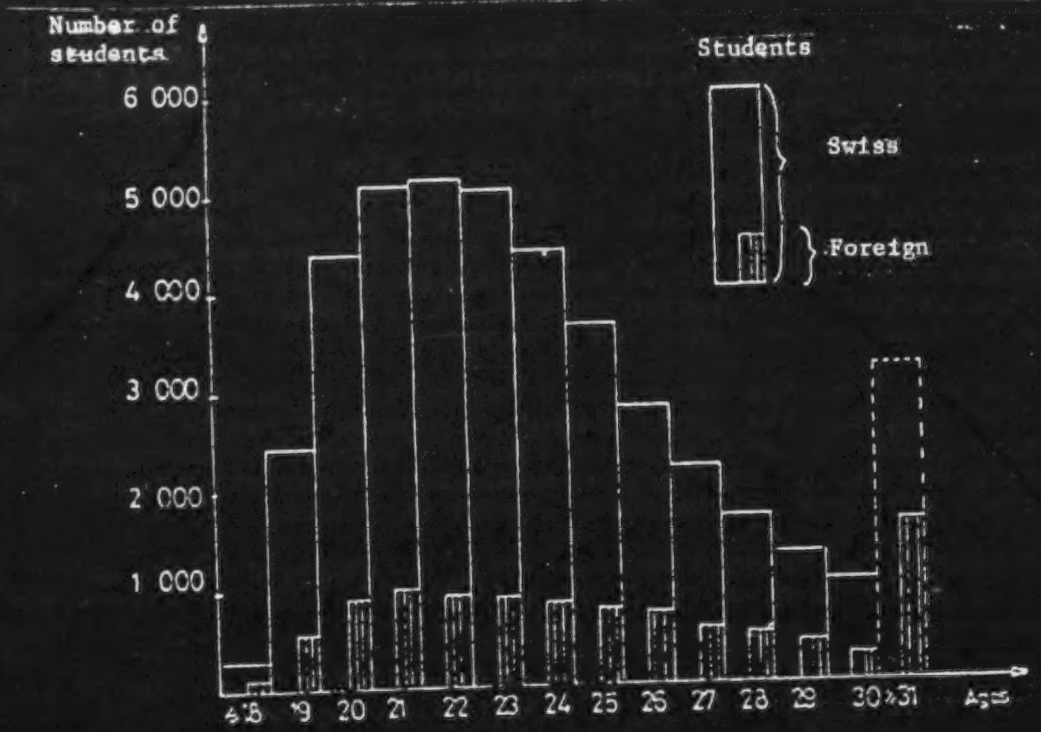
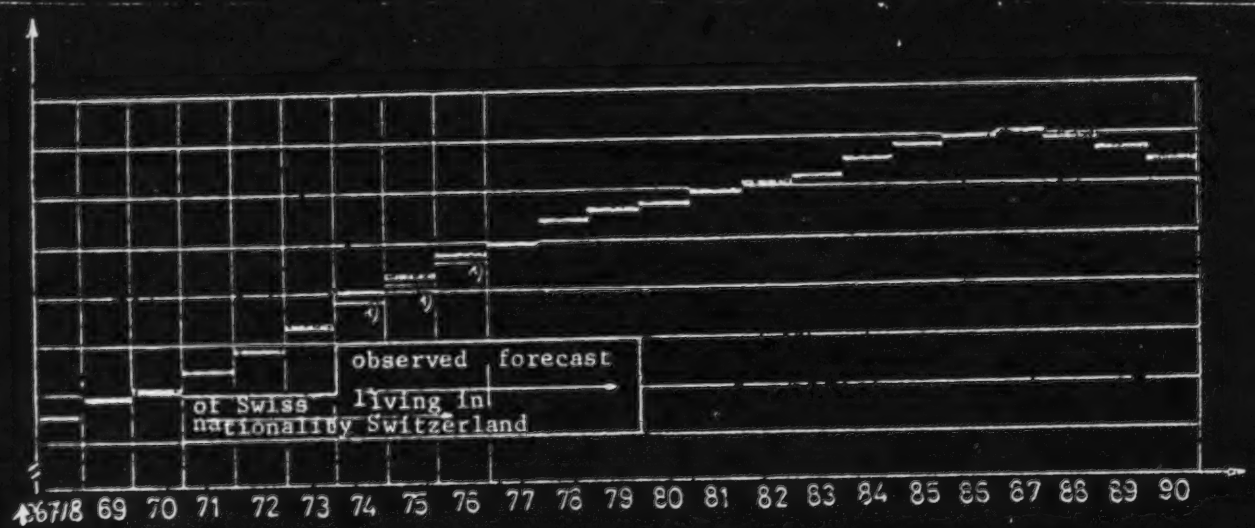
Age structure of Swiss and foreign students (1975/76)



Sources: - Student statistics, SIUS-BFS, Bern 1976
- 3rd CSS report, Bern 1977.

Data and forecast relating to numbers of "Swiss" students (as defined below)


observed forecast
of Swiss (1) living in nationality Switzerland
66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90

(1) of Swiss nationality.

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This shows both the rate of expansion of the system and the rising enrolment of the resident population. Any absolute increase between 1969/70 and 1975/76 has primarily affected 19-21 year-olds.

Looked at in another way, enrolment rates are highest in the 21-23 year age-group, whatever the year. The first set of figures points to an increase in enrolment at the lower end of the age-group, which is a sign of an expanding system, whereas the second shows, in addition to an increasing level of enrolment among the resident population, the years of highest intensity within (and departure from) the system.

The length of the programme of study is obviously an important consideration, but the predominance of younger students in this structure points to an expanding trend in university enrolment. The age structure of the foreign students, on the other hand, is flatter and does not indicate marked expansion.

According to present calculations, the Swiss student body should continue to grow until around 1985-86 (1983 for first-year students).

Taking 1976 as a basis, the increase in the total number of Swiss students should be 43% or nearly 18,500 students.

This forecast does not, however, correspond to that for the number of available university places.

This forecast was made for the 3rd CSS report and refers to "students living in Switzerland before commencing their higher education", although the relevant data have only been available since 1973/74. The proportion of foreign students meeting the above definition (ie living in Switzerland) was estimated to be stable for the period of forecast.

Between 1975/76 and 1986/87, the year of highest enrolment, student population growth amounts to 25%, or nearly 11,500 students. School enrolment in the total resident population in the 20-24 age-group rises from 8.9% in 1975 to 10.75% in 1985; in the 20-29 age-group, from 4.25 to 5.55.

Forecasts of numbers of first-year Swiss students by field of study are as follows:

Forecast numbers of first-year Swiss students
by study group, 1976 86

	1976/77	1979/80	1982/83	1985/86
Theology	140	140	160	160
Law	950	1,045	1,170	1,180
Econ. + soc. sciences	1,495	1,650	1,890	1,930
Medicine	1,150	1,225	1,360	1,375
Literature	1,680	1,860	2,110	2,125
Sciences	1,040	1,120	1,255	1,260
Arch. Eng.	1,475	1,605	1,830	1,855
Other	30	35	40	40

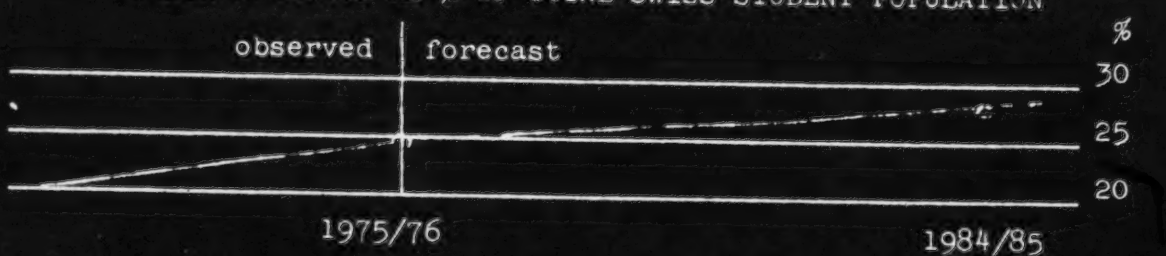
With regard to the enrolment of women, a middle course should be adopted in forecasting: an unfavourable economic situation alone should not interfere with the trend at university level, especially as the hypotheses for the secondary level indicate an increasing proportion of girls in the school population.

However, the economic situation must be combined with the demographic situation, and here a problem arises in respect of the field of study to which most girls are attracted,ie literature, including teacher training, with reduced employment opportunities as the result.

There is also what might be called a cultural or regional impediment: 42% of the students at the University of Geneva (out of the total number of Swiss students enrolled) are women but in Bern the figure falls to 24% and in the EPFs to 9%. Similarly, the economic situation is unfavourable to female employment, and the Federal committee on women's affairs sees some risk of a return to the social values of the past.

According to forecasts, the proportion of Swiss women in the total student population should rise from 25% to 27.5% between 1975/76 and 1984/85, or in other words more slowly than the rise observed between 1967/68 and 1975/76, and become stable thereafter.

WOMEN STUDENTS AS % OF TOTAL SWISS STUDENT POPULATION



Source: 3rd CSS report.

In fact, the proportion of women students rose more rapidly between 1967/68 and 1975/76 than did the total student population.

The proportion of women is always higher among foreign students, the figures for 1975/76 being 32.9% and 25.3% respectively.

For the total Swiss student body, the number of women rose more rapidly than the number of men, doubling between 1967/68 and 1975/76, whereas the number of men students rose by approximately 40%.

Full particulars of the social background of the entire student population are not available. The universities themselves conduct occasional surveys, and in 1971 our office asked a group of experts from Aarau to analyse the academic results obtained by holders of the Federal maturité certificate; the analysis related to first-year students in 1965.

The survey also covered the educational level of the parents of first-year students in 1965:

Educational level of parents of first-year students, 1965

Educational level	Father	Mother
	% of total	% of total
University education	28.1	6.7
Advanced technical school	23.2	22.1
Vocational training	37.7	33.5
	3.6	8.8
Short vocational training	1.6	2.2
No training	5.5	26.4
Total	100.0	100.0

Source: H Ries, Studienverlauf an Schweizer Hochschulen, Part 2.

and the father's profession

Occupation of fathers of first-year students, 1965 (% of total)

Occupation	%	
WORKERS		10.3
- unskilled	1.3	
- semi-skilled	1.8	
- skilled	3.6	
- foreman	1.7	
- master mechanic	1.9	
EMPLOYEES/OFFICIALS		46.8
- assistant, office assistant	0.2	
- employee/official without responsibilities	8.3	
- junior employee/official	13.9	
- medium-grade employee/official	12.1	
- senior employee/official	11.8	
TEACHERS		8.2
- primary	2.7	
- lower secondary	1.7	
- vocational	0.2	
- upper secondary	2.1	
- university-level	1.5	
SELF-EMPLOYED		33.5
- farmer (small holding)	2.1	
- farmer (medium and large holding)	2.2	
- self-employed (trades)	7.0	
- self-employed (retailing)	3.5	
- self-employed (wholesale)	1.7	
- entrepreneur (up to 100 employees)	5.2	
- entrepreneur (over 100 employees)	1.6	
- self-employed university graduates (including clergy)	9.4	
- self-employed in the fine arts	0.7	
NOT KNOWN/DISABLED		0.2
TOTAL		100.0

Source: H Ries, Studienverlauf an Schweizer Hochschulen, Part 2 (1)

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(1) Report published in 1975: Der Studienerfolg der Studierenden mit einem Maturitätszeugnis der Eidgenössischen Maturitäts-kommission. H Ries and sundry working papers.

In 1975 the University of Zurich published a study relating to its own student population, which confirmed these figures.

The other branches of tertiary education are mainly attended by the following age-groups:

	age-group	distribution by sex	
		F as %	M
Teacher training schools	18-21	70	60
Social work	20-23	50	50
Paramedical	18-22	90	10
Commerce, transport, administration, tourism	19-21	60	40
Media, information, communications	20-23	75	25
Technical (ETS and agricultural)	20-24	2	98

Of the 31,000 students in these schools in 1975/76, 2,200 held maturité certificates. In the same year, 13.5% of the 20-21 age-group entered parauniversity schools and 5.4% entered universities (including EPF).

No specific forecasts have been made for the future student population in these branches.

2.3 Success and failure in tertiary education

As mentioned earlier, the length of courses varies from one university and department to another. Some fields of study are subject to uniform regulations (EPFs, medicine in particular) and intermediary examinations are held, whereas in others there is only a final examination. The trend is towards more systematic regulations. In practice, courses of study are often prolonged beyond the normal duration (if any). The move from one level to the next again depends upon the course and university chosen (except for medicine, which is dealt with at the Federal level). In some fields and universities, a second degree is required before beginning a doctorate. The tables on the following page give a general outline:

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Field of study	Minimum length of course according to regulation (1)		Average length of studies (2)
	No. of semesters after which a degree can be received, but no further degree begun	No. of semesters required to begin further degree	Academic Year 1965 (No. of semesters) (degree/diploma)
Theology (Prot.)	7-8	7-10	)
Theology (Cath.)	10-12	14-16	) 11.5
Theology (Cath. Chr.)	8	*)	)
Law	6-8	10-12	12.5
Economic and social sciences	6-8	10-12	(10.9 (9.9 (
Political science	6-8	12-16	-
Sociology	6-8	*)	-
Medicine	13	*)	13.9
Dentistry	10	*)	-
Veterinary medicine	10	*)	-
Pharmacy	11	*)	-
Phil. I (Lit./Langs.)	7-8	*)	10.6
(Upper secondary teaching)	6-7	-	7.2
Phil. II (Lit./Langs.)	6-8	*)	11.3/13.0
Engineering	8	*)	10.4
Architecture	8-10	*)	11.5

E Garke, Amt für Wissenschaft und Forschung, 1974.

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(1) Schweizer Studienführer 1974, Bern 1973, and Hochschulen der Schweiz (Hrg: Schweiz. Zentralstelle für Hochschulwesen).

(2) H Ries/H Kriesi, Studienverlauf an Schweiz. Hochschulen, Part V, Aarau 1974.

* no prescribed number.

E. Garke, Amt für Wissenschaft und Forschung, 1974.

The regulations governing other tertiary courses are more precise and must, as a rule, be respected; however, they vary according to the institution and diploma awarded.

Teacher training schools	
- lower secondary	3 years
- kindergarten and governesses	2-4 years
- vocational training instructors	1-2 years
Social services	
- social workers	3-4 years (night school)
- specialised services	2 1/2 years
- remedial teaching	2-3 years
Paramedical	
- nursing	3 years
- med. therapy	2-3 years
- med. technical	2-3 years
Commerce, transport, administration, tourism	6mths - 2 years
Media, information, communications	2-4 years
Advanced technical schools (ETS), agriculture	
- ETS	3-4 1/2 years (night school)
- other technical schools	2 1/2 years
- agriculture	1-3 years

At present the numerus clausus has not been adopted in Switzerland (except for some social work or paramedical courses), but the threat exists, as said above, for medicine and psychology in particular.

Academic failure/success

In their study (mentioned on page 38), Mr Ries and his colleagues grouped students (1965 entrants) according to the following criteria:

- type of university entrance qualification (maturité, entrance examination, primary teaching brevet etc)

- type of secondary school attended (state or private recognised by the Confederation, state or private not recognised by the Confederation)

- university and field of study.

In each group the experts calculated the percentage of students of 3 kinds, those who successfully completed their studies, those who dropped out, and the "eternals".

Success rates varied between 40 and 78% depending upon the group, and between 7 and 23% (excluding "eternals") left before obtaining a degree.

Variables			Successfully completed		Interrupted		Difference	
			T	H	T	H	E	A
School	Sex	f	58.6	79.8	9.4	25.6	23.2	16.2
		m	49.3	84.9	2.3	17.8	35.6	15.5
	Age	y	54.3	85.7	1.2	16.4	31.4	15.2
		o	47.4	70.3	12.5	26.3	22.9	13.8
	Level	LL	38.7	100.0	0.0	28.6	61.3	28.6
		ML	46.6	85.7	8.7	20.7	39.1	12.0
		UL	50.0	81.8	0.0	18.2	31.8	18.2
	Entrance qualification	FM	52.9	88.2	0.0	15.6	35.3	15.6
		MCC	37.5	77.8	10.3	22.1	40.3	11.8
		CM	26.3	73.3	0.0	34.2	47.0	34.2
	Field of study	MED	64.4	73.0	4.6	7.7	8.6	3.1
		LAW	51.3	75.6	0.0	12.9	24.3	12.9
		EC	50.0	75.0	7.3	31.3	25.0	24.0
		SOC	36.8	70.4	11.1	23.6	33.6	12.5
		PHIL	37.2	57.9	6.3	23.3	30.7	17.0
		HIST	25.0	81.8	8.0	42.1	56.8	34.0
		NAT 1	34.3	96.0	0.0	34.3	61.7	34.3
		NAT 2	26.2	60.8	0.0	14.1	34.6	14.1
			Average difference				35.7	18.5

The middle columns give the lowest (T) and highest (H) values and the last columns the difference between them. Abbreviations stand for the following:

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y	=	students under 22 years at matriculation
o	=	students 22 or over at matriculation
LL	=	first degree
ML	=	second degree
UL	=	third degree
FM	=	maturité certificate issued by recognised upper secondary school
MCC	=	maturité issued by Federal maturité board
CM	=	canton maturité certificate
MED	=	medicine
LAW	=	law
EC	=	economic sciences
SOC	=	social sciences
PHIL	=	philological sciences (languages)
HIST	=	history
NAT 1	=	exact sciences
NAT 2	=	natural sciences

Women students, older students, and those from the lower social classes abandon their studies more often than do men, young students and those from the upper classes. With regard to successfully completed courses, however, little or no difference is found on the basis of these criteria.

On the whole, women, older students and those from the lower social classes may be said to have a tendency to abandon their studies when faced with the "quit or continue" choice, whereas men, younger students and those from the upper social classes are more inclined to stay on.

Source: H Ries,"Studienerfolg der Studierenden mit einem Maturitätszeugnis der Eidg. Maturitätskommission", 1975.

Because of the high level of instruction in the ETS, the rate of failure or drop-out (difference between the number of students admitted and the number of diplomas awarded, measured over a 5-year period) is also very high. It varies from 3 to 60% in full-time ETS (averaging between 10 and 30%) and from 20 to 70% in night schools (averaging between 40 and 50%).

We have no information on other tertiary courses.

2.4 Cost of tertiary education

In relation to the gross national product (GNP), the trend in expenditure for universities (EPF included) - operational expenditure and investments, but not grants - has been as follows:

	% GNP
1965	0.52
1966	0.62
1967	0.66
1968	0.67
1969	0.72
1970	0.78
1971	0.87
1972	0.88
1973	0.95
1974	0.98
1975	1.03

Source: Annuaire statistique de la Suisse.

The proportion of expenditure on universities (including EPF) in relation to total public expenditure (by Confederation, cantons and municipalities) is as follows (1).

	%
1970	3.63
1971	3.84
1972	3.85
1973	3.99
1974	4.01
1975	3.90

The histograms below show how expenditure on education and research is shared out by the authorities at the different levels. The figures represent average percentages for the period 1970-1974.

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(1) Although the municipalities' contribution to university finances is negligible.

Key:

Confederation

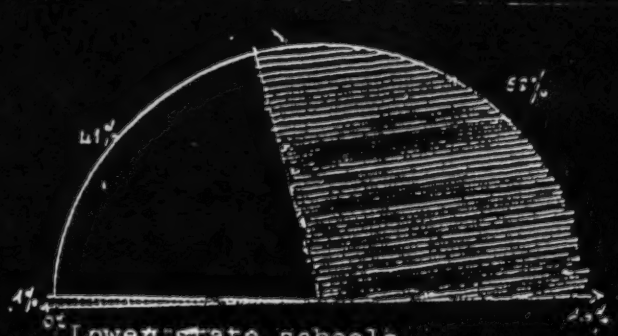
Cantons

Municipalities

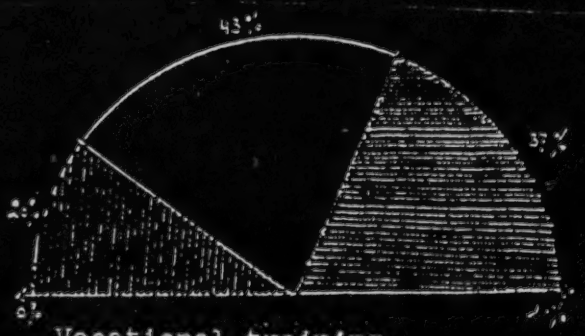
EXPENDITURE FOR EDUCATION AND RESEARCH: SHARES OF CONFEDERATION, CANTONS AND MUNICIPALITIES AT EACH ACADEMIC LEVEL

AVERAGE OVER 4-YEAR PERIOD

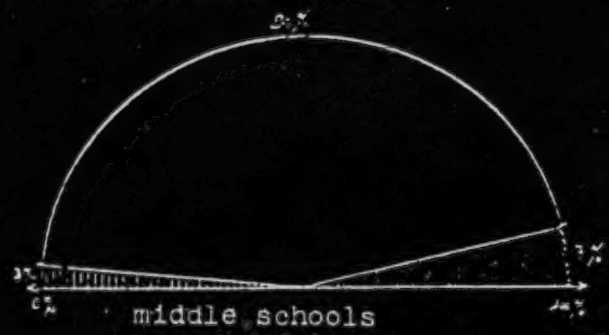
1970-74



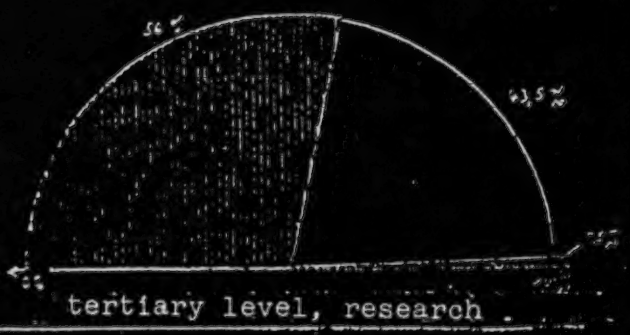
Lower state schools



Vocational training



middle schools



tertiary level, research

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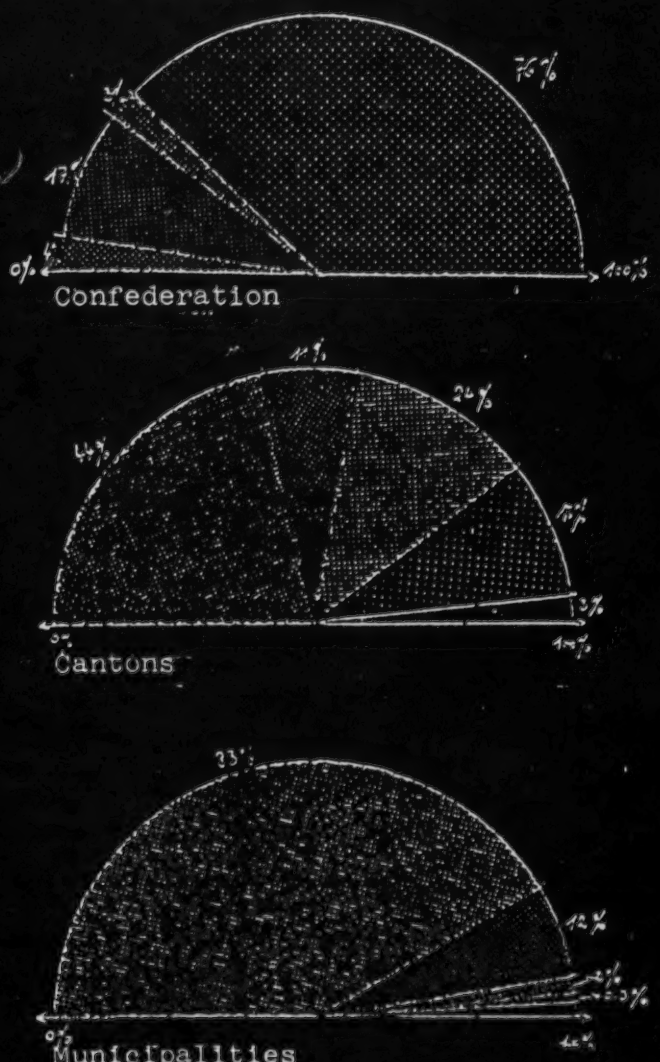
The figures below show the share of public expenditure on education and research allocated to each level of education.

These values are also averages relating to the same period 1970-1974.

PARTS PROPORTIONNELLES QUE REPRÉSENTENT LES DIFFÉRENTS NIVEAUX SCOLAIRES DANS LES DÉPENSES D'ENSEIGNEMENT ET DE RECHERCHE DE LA CONFÉDÉRATION, DES CANTONS ET DES COMMUNES.

MOYENNE DES ANNÉES 1970-1974



Key :

- state schools
- vocational training
- "middle" schools
- university-research
- non-attributable

Source: 3rd CSS report

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Statistics relating to expenditure for parauniversity education, which may be borne entirely by the authorities grant-aided by them, or borne by private institutions, are not available.

With regard to future costs, an additional financial effort will be required to cover the foreseeable rise in the student population between now and 1985/88.

The prospect of a fall in student numbers thereafter implies the adoption of emergency measures in the coming years, although they would not be acceptable in the long run. The necessary increase in the number of student places will have to be brought about by means of changes in organisation and staffing rather than through expansion or new building. A substantially larger number of students could be accommodated in many departments by making a more rational use of present premises and equipment without massive capital investment, provided, of course, that there is a corresponding increase in staff. By the improved organisation of study and, in particular, more effective assistance to students in their first semesters, the time spent at university could be reduced, thereby increasing the tertiary intake capacity.

Exact forecasts of future expenditure are not available (see, however, the following tables). Some cantons (and the Confederation, with regard to the EPFs) have set ceilings for expenditure (restricted annual increases).

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Operational expenditure, including cost of university clinics where relevant (*)

Existing Schools (millions of francs) (1975 price level)

	1978	1979	1980	Total 1978-1980	of which, for clinical human medicine	1981(2)	1982(2)
Basel (1)	140.9(2)	140.9(2)	(142.0)(3)	423.8 (1)(2)(3)	97.8(1)(2)	(142.0)(3)	(142.0)(3)
Bern (1)	153.2	159.0	161.9	474.1(1)	96.6(1)	166.7	170.5
Fribourg	35.6	36.6	37.6	109.8	-	38.5	39.2
Geneva (1)	180.1	186.6	193.3	560.0(1)	68.3(1)	200.1	207.1
Neuchatel	17.3	18.2	18.9	54.4	-	19.8	20.6
St. Gallen	20.8	21.5	22.2	64.5	-	22.8	23.6
Lausanne	87.0	96.5	104.0	287.5	59.7(1)	112.1	120.7
Zurich	270.4	284.6	296.5	851.5	205.2	310.7	(324.7)(3)
1. Existing canton schools	905.3	943.9	976.4	2825.6	-	-	-
EPF Lausanne	66.5	67.4	/	/	/	/	/
EPF Zurich	203.8	204.9	/	/	/	/	/
2. Federal schools	270.3	272.3	/	/	/	/	/
3. All university-level schools (1 + 2)	1175.6	1216.2	/	/	/	/	/

* For Federal subsidies of canton universities (the EPFs are wholly financed by the Confederation)
(1) Clinical medicine: partly, CUS estimate.
(2) Tentative figure.
(3) CUS estimate (extrapolated).
(4) Proportion borne solely by the hospital.
/ = no forecast

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Investment (including clinics) (millions of francs) (1975 price level)

	by year					by period		
	1978	1979	1980	1981	1982	1978-80	1981-82	1978-82
Basel (1)	29.4	28.9	40.8	38.2	37.8	99.1	76.0	175.1
Bern (1)	33.3	29.8	29.6	28.0	21.5	92.7	49.5	142.2
Fribourg	5.6(3)	3.5(3)	3.3(3)	3.2(3)	5.7(1)	12.4	8.9	21.3
Geneva	43.9	57.1	60.0(1)	60.0(4)	60.0(4)	161.0	120.0	281.0
Neuchatel	7.2	5.2	4.2	4.1	(1.7)(3)	16.6	5.8	22.4
St. Gallen	0.3	0.4	0.3	9.0	14.1	1.0	23.1	24.1
Lausanne (1)	57.7	57.9	45.0	31.6	29.3	160.6	60.9	221.5
Zurich (2)	119.2	82.9	65.7	82.7	79.7(4)	267.8	162.4	430.2
1. Existing canton schools	296.6	265.7	248.9	256.8	249.8	811.2	506.6	1317.8
EPF Lausanne	/	/	/	/	/	/	/	/
EPF Zurich	/	/	/	/	/	/	/	/
2. Federal schools	110.0	105.0	100.0	-	-	315.0	-	-
3. All university-level schools (1 + 2)	406.0	370.7	348.9	-	-	1126.2	-	-
51. Aargau	3.5	5.0	2.5	0	0	11.0	0	11.0
52. Lucerne	5.5	8.6	33.1	42.9	40.6	47.2	83.5	130.7
7. All canton university-level schools (1 + 5)	305.6	279.3	284.5	-	-	869.4	-	-
8. All university-level schools (3 + 5)	415.6	384.3	384.5	-	-	1184.4	-	-

(1) 40% investment for clinics.
(2) Investments for clinics: Part E + R according to particulars supplied by the cantons.
(3) Annual instalments; estimates only.
(4) Average values.

/ = no forecast

Source: Message from the Federal Council to the Chambers, 1976.

2.5 Research in tertiary education

Needless to say, university and EPF professors are required to carry out research (R). There are no legal regulations in this matter, however: the professors themselves take the initiative, conduct their research and publish their results, in pursuance of the principle of the freedom of instruction and research which is guaranteed in our schools - although publication and financial considerations exert some control.

Too much decentralisation may lead to dispersal of effort, however, and a delicate balance must be maintained between total control and absolute freedom. It is not surprising that the Swiss authorities are now seeking to define the procedure to be followed in this field.

Research has its own imperatives, which cannot fail to affect the direction followed by the entire system of higher education. The relative scarcity of first-class research workers, the growing diversity of specialisations and the amount of material equipment and size of teams needed for effective research nowadays are so many elements which dictate total and partial strategies and make closer relationships between schools an imperative.

University administrations are sometimes criticised as having been too weak to allow a genuine university "management" to develop.

The targets of this criticism do not deny that some reproaches may be justified, but most contend that the organisation of university research thus far has been more than adequate to the situation. Emphasis in the past has been on the need to allow individual abilities to develop and flourish, rather than on the determination to rationalise and channel work in each school. As a result, the universities attempted to organise favourable conditions for research by facilitating relations between those engaging in it and the sources of finance.

Both vertical and horizontal structures accordingly grew up within universities.

To provide the vertical aspect the Swiss universities set up a large number of specialised institutes directed either by a single professor or, where their size required, by a director assisted by several professors. This machinery can operate harmoniously because of its horizontal accompaniment, consisting mainly of research committees and sub-committees dealing with disciplinary specialisations. The task of these committees, composed of eminent research workers, is to analyse research programmes and proposals in terms of their scientific merits, in order either to allocate the funds specifically set aside for research by the university or to submit conclusions to the Federal bodies (see FN below) which subsidise research.

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In the past, thus, university research has proceeded mainly in a spirit of "laissez-faire" and trust in individual endeavour. In the last few decades, however, an atmosphere of intense competitiveness has undeniably become the main-spring of developments in university research.

The rivalry operates on several levels. At the national level, the comparative affluence and importance of projects undertaken by the EFP research teams have represented a very definite challenge to many universities.

Internationally, the relations between Swiss scientists and the world academic community have always been sufficiently intimate to make possible the rapid circulation of information and to maintain the Swiss researchers' spirit of emulation. This attitude has been supported by the universities, which have often hired first-rate foreign workers without scruple.

Many observers are persuaded, however, that the effort to train new researchers and expand research in the last 15 years have brought about far-reaching transformations incompatible with traditional structures.

Today some scholars will concede that the "laissez-faire" approach has caused a proliferation of curricula which weight down the whole system. In some universities the founding of new institutes today seems highly problematical. Furthermore, in many cases the diversification of specialisations precludes any rationalisation and diversificationof effort.

In future, it will be for the universities themselves, with the support of canton and Federal authorities, to work out strategies which will enable them to play their rightful role in the progress of research. Intensified international co-operation, selectivity in research programmes and closer ties with other tertiary institutions would appear to be the principal means to this end for individual universities.

Another Swiss objective is to preserve the unity of teaching and research within the schools. There are very few research institutes outside the universities(1) and they maintain close relations with one or another university, their directors being professors as well. The cost of research infrastructure is borne by the cantons (Confederation, in the case of the EPFs), but they are subsidised by the Confederation under the Aid to Universities Act (LAU). Apart from these grants, the main form of financial assistance given to cantons by the Confederation in the field of research is the endowment of the Swiss National Scientific Research Fund (FN) to which professors submit projects when applying for individual grants.

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(1) Engaging in basic research ./.

The regulation teaching load varies with the department and school. Most full professors teach 6-10 hours a week.

The recession has made almost no impact on research. However, there has been some wastage in the past and efforts are now being made to avoid this by making better use of available resources, by closer co-operation and more judicious division of labour. However, cantons must adopt priorities in their universities; and the Confederation is now making (and will continue to make) substantial commitments for research. The Federal government understands that any reduction of its efforts in this direction would seriously impair Switzerland's position in international scientific progress; such a policy would deprive the economy of elements which are of prime importance to its growth.

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CHAPTER 3: TERTIARY EDUCATION AND THE EMPLOYMENT MARKET

If the authorities have done so much to encourage secondary and higher education in recent decades, it was primarily with an eye to the needs of the economy and the state in terms of university output. In a period of intense activity the economy required an enlarged tertiary education system to provide more young graduates who were needed for production, selling and research. Various analyses and forecasts of needs have shown that numbers of graduates will still be inadequate in the long term, in professions for which such degrees are essential.

Heavy investment in education is plainly fully justified, however, only if young graduates can find suitable jobs after completing their studies. Foreign experience has demonstrated beyond any doubt that "graduate output" cannot be regulated to correspond exactly to needs at every moment, even when the state can modify output by restricting admissions. In Switzerland, entering students have always responded promptly to changes in the employment market, however, which is why there has been a surplus of graduates only for brief periods in the past, and in isolated branches of activity.

In the view of the prevailing uncertainty with regard to the future employment situation, the authorities are refusing to base their education policy on job opportunities alone, and social demand has now become the decisive factor.

The building trades show signs of saturation, as do psychology and sociology. The birth rate is falling, and teachers are already and will continue to be affected. Historians and the "literary" in general, who have hitherto found their places teaching in gymnasiums, are likely to have difficulty in the future.

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CHAPTER 4: REFORMS

Primary:

- Smaller classes(average numbers have been reduced from 30 to 25 during the last 10 years).
- Instruction in two subjects has already been modernised (mathematics and second national language).
- In all subjects, teaching reforms tend towards the following:
  - group work, with a view to socialisation and to stimulate shared discovery;
  - the child's autonomy and sense of responsibility;
  - creative activities in all fields;
  - reasoning and skills, but without neglecting knowledge acquisition.

Lower secondary:

In five cantons, structural reforms have instituted an observation and guidance period lasting 3 (Geneva, Valais, Fribourg)or 4 years (Neuchatel and Tessin); all pupils remain in the same school instead of being separated into primary and secondary schools. In both cases, schools have separate courses for maturité, diploma or vocational certificates and there is little possibility of upward transfer despite remedial classes. A few isolated experiments have accordingly been put in hand - first in German-speaking and then in French-speaking Switzerland - involving unstreamed classes (occasionally subdivided into groups) and level sets in two or three subjects, in an attempt to overcome the vertical barriers.

Upper secondary:

The number of maturité courses recognised by the Confederation has been increased by the addition of D (modern languages) and E (socio-economic) types to the 3 basic courses, A (Latin-Greek), B (Latin -languages) and C (science-languages). In order to award E maturités several advanced business schools have had to revise their curricula, which were exclusively commercial and not socio-economic. With regard to reforms in individual disciplines, mathematics has been the centre of the most intense controversy, but also the subject most radically changed.

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Vocational and technical education:

Two major innovations should be mentioned, with regard to the Federal Vocational Training Act (1963) and its implementation order of 1965. Under the former, cantons are obliged to organise vocational guidance for young people. The latter lays down new regulations for vocational and supervisory examinations for the future employees of firms: the vocational examination is taken by holders of an end-of-apprenticeship certificate of capacité who have at least two years experience in their trade, whereas the supervisory examination is for people who have already passed the vocational exam and worked a further two years. In occupations in which no vocational examination is given, candidates may sit the supervisory examination after three years of employment.

Teaching training:

Canton legislation and regulations have provided for longer training at all levels (preschool, primary and secondary), to improve both the general training given in the first years and the practice in method acquired during the final years.

Higher education:

The main changes at this level affect two areas, greater financial assistance from the Confederation and the introduction of participation by intermediate staff and students in Bills and Acts relating to university-level education.

The Confederation's contribution to the financial support of higher education has been expressed by the assumption and responsibility for the University of Lausanne's polytechnic (in 1968) and by the Aid to Universities Act (LAU, amended in 1971 to increase aid still further). A new Act on aid to university-level schools and research has just been adopted by the Federal Parliament and was to become effective on 1 January 1978. The referendum process has been set in motion, however, by opposition to this Act, and the outcome of the vote may not be favourable to it. The object of the new law is to make possible the co-ordination and most judicious possible allocation of the resources available to universities.

Provision has been made for the participation of students and intermediate university staff in all legal texts drawn up in the last five years; but these texts vary from one university to another and in several schools they are only experimental.

A Bill on the EPFs is also being debated at present, the main objective of which is to improve the organisation of these schools.

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New and major trends can be distinguished in many different and not always related areas, eg:

- universal adoption of a 9th year of compulsory schooling;
- intensification of experiments;
- greater co-operation between researchers, school authorities and teachers;
- greater individualisation in teaching;
- a more interdisciplinary approach to teaching;
- emphasis on general education in vocational and technical courses;
- reform of teaching training;
- movement towards co-ordination at regional and national levels.

Source: "L'Enseignement en Suisse".